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Naval Medical Surveillance Report

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From The Preventive Medicine Director

CAPT Bruce K. Bohnker, MC, USN (FS)

The past few months have been interesting to say the least. We have successfully relocated to the tenth floor of building 215 at Portsmouth Naval Medical Center Complex. Our new address and staff phone numbers are posted on our Web page at: <http://www-nehc.med.navy.mil/prevmed/pm1ph.htm>. The new spaces are light and airy, and the view of the river is spectacular. The move experience has included a couple of speed bumps along the way. We believe that the Naval Disease Reporting System (NDRS) is back up after a number of difficulties to overcome, particularly some changes in the computer address routing.

We have another epidemiologist on our Preventive Medicine (PM) Directorate staff, Ms. Asha J. Riegodedios, MSPH, who brings with her many years of public health experience. We also welcome HM2 (SW) Collin Bowman, USN, from the USS DETROIT (AOE-4) and HMC (SW) Fred Gutermuth, USN, from the USS DWIGHT D. EISENHOWER (CVN 69); both bring to the directorate and to the command a wealth of shipboard PMT experience.

The 42nd Navy Environmental Health Center (NEHC) sponsored Occupational Health and Preventive Medicine Workshop in "Charming Chesapeake" went exceptionally well with much

thanks to many people especially CAPT Jim McGinnis, Workshop Director. The PM Directorate's Public Health Educator, Ms. Becky Washburn was recognized for her outstanding informational poster in the Preventive Medicine category. The poster, "An Innovative Public Health Education Program in Malaria Prevention in Latin America: Leadership, Championship and Partnership" won First Place from a field of exceptional posters from many commands. I would like to thank the workshop's PM session coordinators: CDR Michael Mann (Entomology), CDR Mark Malakooti (Epidemiology), and LT Rohini Suraj (Environmental Health). Also, thanks to the outstanding presenters whose efforts made this workshop such a success.

After the move and the workshop, the NEHC PM staff is working to get back in stride for the day-to-day business. We are updating a number of publications and instructions, as well as expanding Disease Non-Battle Injuries (DNBI) reporting across the fleets. We continue to work to upgrade the NDRS program and analyze the data to favorably impact the health and well being of our Sailors and Marines. It is also time for planning for the NEHC workshop next year, expected to be in San Diego, California. We will keep you posted on the dates and place. Thank you for your continued support.

Scrub Typhus Revisited: A Second Outbreak Among U.S. Marines At Camp Fuji, Japan

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Background

Scrub typhus is an infection caused by the *Rickettsia* organism, *Orientia tsutsugamushi*, transmitted to humans by infected mites (chiggers). After a 6 to 21-day incubation, there is usually a sudden onset of fever and severe headache, muscle pain, and swollen lymph nodes. Other symptoms may include dry cough, eye pain, conjunctival injection, and apathy. A maculopapular rash frequently develops over the trunk and extremities after about five days of illness. An eschar may develop at the site of an infected mite bite in about half the cases. Serious neurological symptoms may occur in a small number of untreated cases. Mortality rates in untreated cases range from 0-30%.

Scrub typhus has a sporadic history at the Camp Fuji military training area near Mount Fuji, Japan. The most recent outbreak occurred in November 2000 and involved ten cases from the 3rd Battalion / 3rd Marine Regiment (3/3 Marines). Prior to then, the last reported outbreak among US military was in 1981 (forty clinical cases). According to archived records at NEPMU-6, the first documented human cases among US military in the area occurred in 1948. Cases were also reported between 1960 and 1981 among Japanese troops training there. The area's primary season for scrub typhus is September through December.

Chiggers (larval mites of the genus *Leptotrombidium*) normally become infected while feeding on infected rodents. Other small mammals and some birds and reptiles may also serve as reservoirs.^{1,2} Infected adult mites may pass infection transovarially to offspring. Chiggers inhabit moist microenvironments within grassy, weedy, or forested areas, especially forest edges. They crawl up blades of grass or leaves and

subsequently get on passing vertebrate hosts. Although they normally feed on rodents, insectivores, and ground-frequenting birds, given the chance, they will feed avidly on humans. On humans, chiggers generally crawl to and attach where clothing fits snugly or where skin is tender, such as ankles, groin or waistline. Scrub typhus occurs when inadequately protected humans pass through these microenvironments or "pockets" inhabited by infected chiggers.

Camp Fuji is known for its endemic scrub typhus pockets, and the vector has been shown to be present particularly in the late fall and early winter. Moisture increases the activity of the mites, which corresponds with the onset of the area's rainy season in late September.

Outbreak

Approximately 900 members of the 1st Battalion/3rd Marine Regiment (1/3 Marines) from Marine Corps Base Hawaii (MCBH) were deployed to Camp Fuji training area during 11 October – 09 November 2001. On 12 November 2001 the epidemiologist at the Navy Environmental and Preventive Medicine Unit Number Six (NEPMU-6), Pearl Harbor, HI, received an email message from the Leading Chief Petty Officer (LCPO) of Preventive Medicine at Naval Hospital (NH) Yokosuka reporting that six US Marines from Camp Fuji had been seen in emergency department (ED) over the weekend and were being treated for scrub typhus.

The battalion aid station (BAS) medical personnel attached to the 1/3 Marines had already deployed to Hokkaido for another training evolution. More detailed information about the illnesses was not obtained until the group returned to Okinawa due to lack of communication access with medical personnel while at Hokkaido. However, an independent duty corpsman (IDC) at MCBH who had contact with the BAS IDC reported that the ill Marines responded well to doxycycline.

Methods

The III Marine Expeditionary Force (MEF) preventive medicine officer and entomologist were notified about the presumptive scrub typhus outbreak in the Camp Fuji training area. The Preventive Medicine Department at NH Yokosuka briefed the CO and XO of Camp Fuji on 16 November and stressed personal preventive measures (PPMs) for preventing scrub typhus.

A brief, written questionnaire was administered by BAS corpsmen to eight presumed cases and 29 asymptomatic members (controls) from the same battalion in late December 2001. The main purpose of the questionnaire was to identify risk factors for infection.

Convalescent serum samples from eight presumed cases and 29 controls (21 had also completed questionnaires) were collected by BAS corpsmen in late January 2002 and sent to the Navy Medical Research Center (NMRC) Silver Spring, MD for analysis. A sample from a ninth presumed case was collected on 06 March.

Medical records of the eight presumed cases were reviewed on 22 Feb after the 1/3 Marines returned to MCBH. The record of a ninth Marine who had been admitted to the NH Yokosuka was reviewed on 01 March.

The working case definition was: a Marine who trained at Camp Fuji between 11 October and 09 November 2001 and developed an acute illness between 17 Oct and 30 November that included at least three of the following signs or symptoms: fever (objective or subjective), localized lymphadenopathy, rash, eschar, headache, or myalgias. Laboratory confirmation of a case was a convalescent titer for *O. tsutsugamushi* of greater than 1:100 by Enzyme – linked immunosorbent assay (ELISA) performed at NMRC.

Results

Review of the medical records and interviews with BAS IDCs indicated that nine Marines presented to the BAS

between 06 and 18 Nov 2001 with signs and symptoms suggestive of scrub typhus (Figure 1). Six had a definite eschar (calf or ankle (4); flank (2)). Eight had a rash involving the face, trunk, and/or extremities. Seven of the rashes were described as, “erythematous and maculopapular,” and one was described as, “red, pruritic papules that were insect bite-like in appearance.” Other signs and symptoms included headache (8); objective or subjective fever (7); localized lymphadenopathy (5); myalgias, cough, nausea or anorexia, conjunctival injection, and malaise.

One Marine had been transported to the Naval Hospital Yokosuka ED on 09 Nov and subsequently admitted as an in-patient; five had been transported to the ED on 11 Nov and placed on medical hold; and one had been admitted to the Sapporo Japanese Hospital on 18 November. Seven Marines were subsequently medically evacuated to Camp Hanson, Okinawa. All recovered fully from their illness.

Convalescent serum titers for *O. tsutsugamushi* for the eight cases that met the case definition for scrub typhus were 1:1600 (4) and 1:400 (3). The result for one case is still pending. Serum for 29 controls and the one presumed case that did not meet the case definition tested negative for *O. tsutsugamushi*.

The crude attack rate in this outbreak is 0.89% (8/900). This is similar to the crude attack rate of 1.25% (10/800) in 2000 among the 3/3 Marines.³

Evaluation of risk factors for developing scrub typhus was limited by the small sample size. Thirty-two (84.2%) of all 38 cases and controls reported that they treated their uniform with permethrin before deploying to Camp Fuji. This included seven presumed cases (77.8%) and 25 controls (86.2%). Only one control (3.4%) reported that he had been issued Diethyl Toluamide (DEET). One presumed case (11%) and one control (3.4%) reported using DEET during the field exercise. One control (3.4%) reported using a bed net. The apparent excellent compliance with treating uniforms and poor compliance with DEET and bed nets was supported by the Battalion corpsmen and IDC. The majority (87%) of presumed cases and controls were from B Company. This included

5 (55.6%) presumed cases and 28 (96.6%) controls. Presumed cases were also from A Company (1), C Company (1), Headquarters Service Company (HQSVC) (1), and Weapons Company (1). The company for one control is unknown. Inquires have been made regarding the locations and dates of the companies' movements during the deployment, but the information is still pending.

The majority (82%) of presumed cases and controls were infantry, specifically, riflemen. This included 8 (88.9%) presumed cases and 23 (79.3%) controls. One case was an armory custodian. The other six controls included corpsmen (3), food warehouse worker (1), mess worker (1), and position unknown (1).

Discussion/Summary

Eight cases that met the case definition for scrub typhus (seven of which had laboratory confirmation of *O. Tsutsugamushi*) occurred among a group of approximately 900 US Marines deployed to Camp Fuji, Japan between 02 November and 18 November 2001. This outbreak was temporally and situationally almost identical to the outbreak that occurred in 2000. Scrub typhus is a potentially fatal, but preventable disease spread by the bite of infected mites known to inhabit focal areas, or pockets within this training area usually areas of scrub vegetation.

NEPMU-6 recommended personal protective measures for preventing scrub typhus at Camp Fuji following the outbreak that occurred in November 2000. These measures were specifically targeted to the known behaviors of the chigger mite and centered on applying DEET and using permethrin-treated uniforms and bed nets. The 2000 outbreak also led to III MEF Force Order 6700.1, "Utilization of Personal Protective Measures Against Vector-Borne Diseases," signed 20 June 01, which also centered on DEET and permethrin.

No risk factors were identified for cases compared to controls in the sample evaluated. However, there was widespread use of permethrin-treated uniforms among both groups, and widespread non-use of

DEET or permethrin-treated bed nets among both groups. Given that the scrub typhus vectors inhabit focal pockets within the Camp Fuji training area, it is likely that the Marines who became ill with scrub typhus had the random misfortune of passing through such pockets and being fed upon by the infected mites. Nonetheless, had they been using DEET in addition to wearing a permethrin-treated uniform, it is likely that the mites would have been effectively repelled, and subsequently, infection would have been prevented.

This second scrub typhus outbreak in as many years among US Marines deployed to Camp Fuji could very likely have been prevented by complying with Force Order 6700.1 and NEPMU-6's recommended measures for preventing scrub typhus during Camp Fuji deployments. Preventing future outbreaks of scrub typhus at Camp Fuji requires that Force Health Protection measures against this known health hazard are not only taught to the troops, but are also strictly enforced.

Recommendations

Education and training at the troop level, and strict enforcement at the company and battalion command level of the personal protective measures for preventing scrub typhus during field conditions in Camp Fuji are strongly recommended. Specifically, it is recommended that:

1. The company Gunnery Sergeant (GySgt) and battalion Logistics Senior Non-Commissioned Officer (SNCO) issue all Marines deploying to Camp Fuji adequate supplies of DEET (33%, NSN 6840-01-284-3982) insect repellent prior to entering the field (at least two tubes per month).

2. The company GySgt and platoon NCOs ensure that all Marines carry DEET on their person and apply it both day and night while in the field to the following areas:

- all exposed skin surfaces, including neck, face, and ears (avoid lips, nostrils, and eye area);
- the hands and arms including 2-3" of skin under the T-shirt sleeve (avoid the arm pit);
- the skin under the T-shirt collar, including the uppermost chest and back, and adjacent shoulder area;

- the skin 3" above and below the belt line (avoid genitalia and rectal area);
- the skin on the tops and sides of the feet up to just below the knees;
- the ventilation holes of jungle boots.

3. The company GySgt and platoon NCOs enforce mandatory treating of uniforms with 40% permethrin BEFORE leaving MCBH and avoiding dry cleaning or professional starching after uniforms are treated.

4. The company GySgt and platoon NCOs enforce keeping the main bivouac area clear cut to render potential trombiculid mite habitat less hospitable.

5. The company GySgt and platoon NCOs enforce avoiding pitching individual bedrolls in or near areas with grass, weeds, and forest edges.

6. The company GySgt and platoon NCOs enforce using a permethrin-treated bed net, mosquito dome, or pup tent for optimal nighttime protection.

7. The following measures would not provide optimal nighttime protection and are not official recommendations, but they would

provide additional protection to troops sleeping directly on the ground:

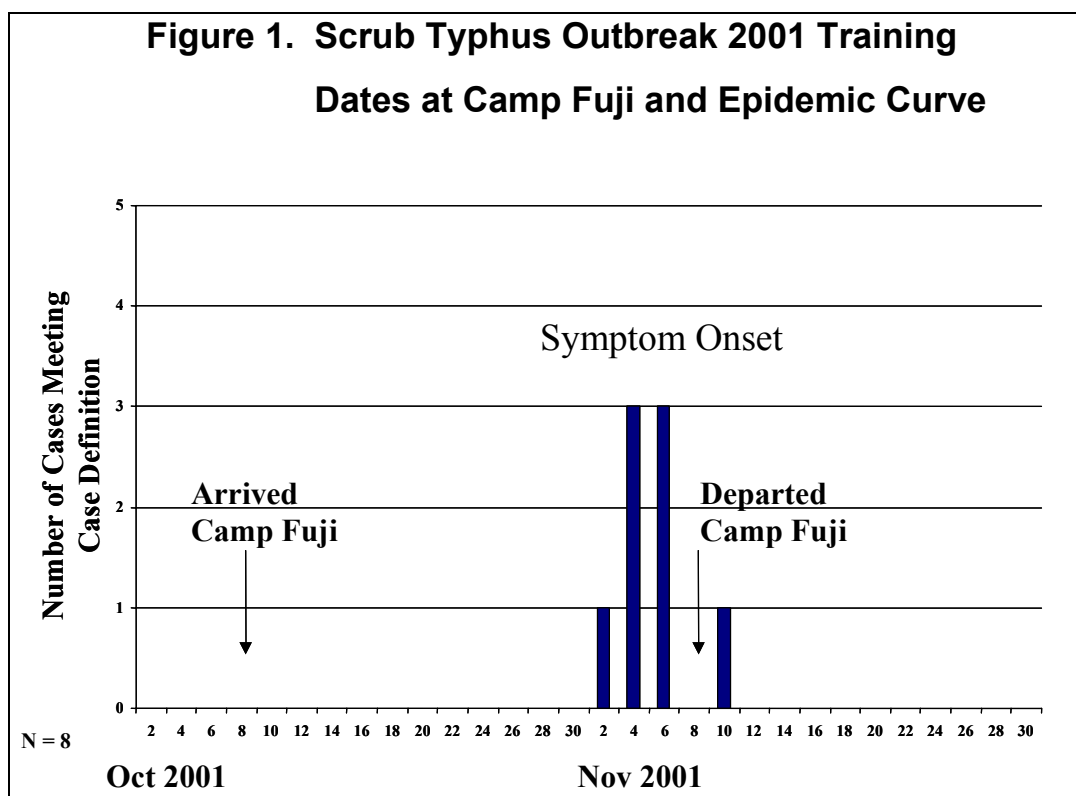
- using a groundsheet of a type of material suitable for permethrin treatment (such as cotton or light canvas);
- using a permethrin-treated bed net as a ground sheet.

Acknowledgements

Special thanks to the following medical personnel from the 1/3 Marines for administering the questionnaires and drawing blood samples, as well as for providing field care to the ill Marines : HM1 A Barker, HM2 R Cabitet, HM3 A Jules.

References

1. Herms W.B., Medical Entomology, 4th Ed., Macmillan, New York, 1956, p. 643
2. Odorico D.M., Drover S.R., Carrie B., Catmull J., Nack Z., Ellis S., Wang L., Miller D.J., "New Orientia tsutsugamushi Strain from Scrub Typhus in Australia," Emerging Infectious Diseases, 1998, 4(4): 641-644.
3. Marienau K.J., May L.A., Beecham H.J., "Scrub Typhus Among U.S. Marines at Camp Fuji, Japan – a Preliminary Report." Jan 2001 *unpublished*.



Completeness And Timeliness Of Reporting Of Hospitalized Notifiable Active Duty Cases, US Navy Medical Treatment Facilities, January 1998-June 2001

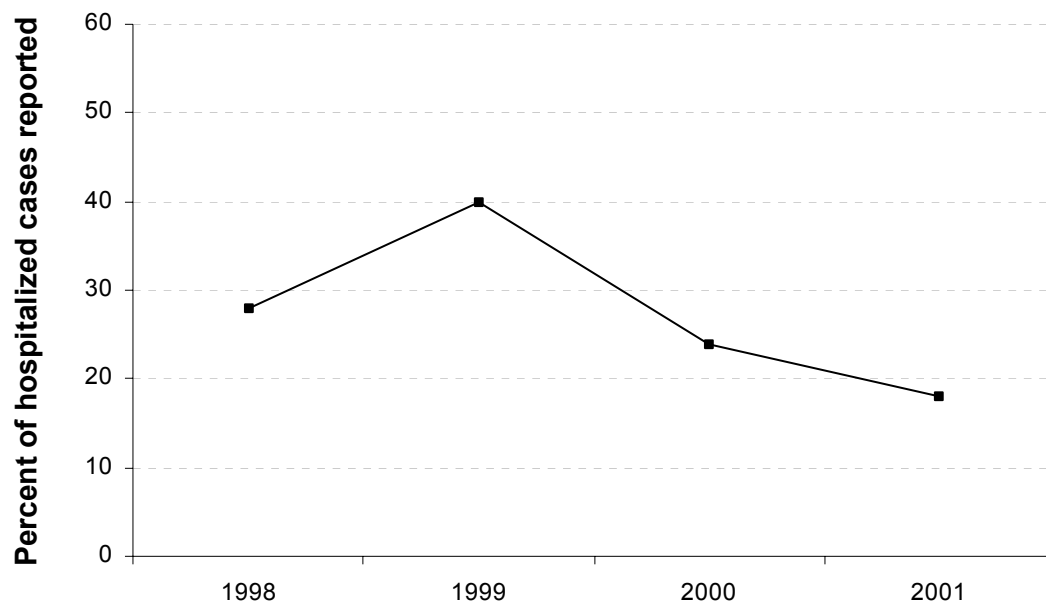
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The US Navy began automated reporting of notifiable medical conditions in 1998. Regional Navy Environmental and Preventive Medicine Units track notifiable medical events in their areas of responsibility and transmit reports to the Navy Environmental Health Center (NEHC). In turn, NEHC is responsible for tracking the overall experience of the Navy and Marine Corps and for transmitting reports to the Army Medical Surveillance Activity (AMSA) for inclusion in the Defense Medical Surveillance System (DMSS).^{1,2} This report

summarizes the completeness of reporting of hospitalized cases of reportable medical events by US Navy medical treatment facilities (MTFs) during the period January 1998 through June 2001. Hospitalized notifiable events among active duty service-members were matched to confirmed events reported to AMSA from NEHC. These events were matched on social security numbers and diagnoses.

Completeness of reporting, hospitalizations overall. Between January and June 2001, there were 82 hospitalizations of active duty service members at Navy MTFs for reportable conditions based on ICD-9-CM coded discharge diagnoses. Of these, 15 (18%) were reported through the Naval Disease Reporting System (NDRS). Completeness of reporting hospitalized cases in 2001 was slightly lower than in 2000 (Figure 1).

Figure 1. Completeness of reporting of hospitalized active duty cases, US Navy medical treatment facilities, 1998-June 2001



(n=34) and varicella (n=21). Estimates of completeness of reporting of these two diagnoses were 9% and 29%, respectively (Table 1).

Reportable Event**	1999			2000			2001		
	NDRS reported	Hospitalized Cases	%	NDRS reported	Hospitalized Cases	%	NDRS reported	Hospitalized Cases	%
Amebiasis	0	0	-	0	2	0	0	0	-
Carbon Monoxide poisoning	0	1	0	0	2	0	0	2	0
Campylobacter	0	0	-	0	1	0	0	0	-
Coccidioidomycosis	2	4	50	2	3	67	0	0	-
Cold weather injury	0	1	0	0	2	0	0	0	-
Dengue fever	0	0	-	0	1	0	0	0	-
Ehrlichiosis	1	2	50	0	0	-	0	0	-
Gonorrhea	0	3	0	1	6	17	1	3	33
Heat injury	13	34	38	11	46	24	3	34	9
Hepatitis A	2	3	67	0	1	0	0	0	-
Hepatitis B	2	4	50	1	2	50	0	0	-
Influenza	0	2	0	1	8	13	0	4	0
Legionellosis	0	3	0	0	0	-	0	1	0
Lyme Disease	0	0	-	0	0	-	0	1	0
Malaria	10	13	77	6	12	50	0	2	0
Meningococcal disease	1	1	100	4	5	80	1	1	100
Pneumococcal pneumonia	2	19	11	0	28	0	1	9	11
Rheumatic fever	0	1	0	0	0	-	1	1	100
Rocky Mountain spotted fever	0	0	-	0	2	0	0	0	-
Salmonellosis	1	3	33	1	1	100	0	0	-
Shigellosis	0	0	-	0	2	0	0	0	-
Toxic shock syndrome	0	1	0	0	2	0	0	0	-
Tuberculosis, pulmonary	8	8	100	3	5	60	2	3	67
Typhoid fever	1	1	100	1	1	100	0	0	-
Varicella	14	37	38	8	33	24	6	21	29
Total	57	141	40	39	165	24	15	82	18

**Reportable diseases and conditions with no hospitalizations from January 1999 to June 2001 were excluded from this table.

Completeness of reporting, by location. There was significant variability in completeness of reporting across MTFs. Thirteen sites reported

no hospitalized notifiable cases; of these, seven had no hospitalized cases that required reporting (table 2).

Table 2. Completeness* of reporting of hospitalized active duty cases through the Naval Disease Reporting System, by medical facility, US NAVY, 1999-June 2001

Location**	1999			2000			2001		
	NDRS reported	Hospitalized Cases	%	NDRS reported	Hospitalized Cases	%	NDRS reported	Hospitalized Cases	%
A	15	20	75	8	11	73	3	7	43
B	3	16	19	5	27	19	3	8	38
C	10	18	56	4	14	29	3	8	38
D	0	1	0	0	0	-	1	3	33
E	1	7	14	3	9	33	1	5	20
F	9	18	50	14	35	40	2	15	13
G	8	20	40	1	21	5	2	26	8
H	0	1	0	0	2	0	0	2	0
I	0	6	0	0	13	0	0	2	0
J	4	10	40	1	11	9	0	3	0
K	1	1	100	0	1	0	0	1	0
L	1	7	14	1	5	20	0	1	0
M	1	2	50	0	0	-	0	1	0
N	0	1	0	1	5	20	0	0	-
O	0	1	0	0	0	-	0	0	-
P	1	4	25	0	1	0	0	0	-
Q	0	1	0	0	3	0	0	0	-
R	1	1	100	0	1	0	0	0	-
S	0	1	0	0	1	0	0	0	-
T	2	5	40	1	5	20	0	0	-
Total	57	141	40	39	165	24	15	82	18

*Completeness is the percent of hospitalized reportable cases that were reported through the Naval Disease Reporting System (NDRS).

**Locations with no reportable hospitalizations from January 1999 to June 2001 were excluded from this table.

Timeliness of reporting of hospitalized cases.

Navy sites transmit notifiable event reports monthly to Environmental Preventive Medicine Units (EPMUs), and EPMUs forward reports to NEHC once a month. Therefore, assessment of timeliness of reporting from Navy sites is not considered relevant or informative.

Editorial comment. The methods used for this assessment may underestimate the actual completeness of reporting (see editorial comment, Army report). However, to the extent that trends are informative, they suggest that

completeness of reporting of hospitalized cases at Navy MTFs may be slightly lower than in previous years.

References

1. Tri-service reportable events: guidelines and case definitions, version 1.0, July 1998.
2. Navy Environmental Health Center, "Naval disease reporting system (NDRS)," Naval Medical Surveillance Report (NMSR), 1998, 1:4, 2.

NMSR Editorial Comment: Currently, 70 medical events are required to be reported for the tri-services. Regular and timely information on these medical events is necessary to ensure prevention and control of the diseases. With regular deployments overseas by the Navy and the Marine Corps (many times to remote areas) it is important to prevent the introduction and spread of diseases into our military forces and into the United States. The threat of bioterrorism also increases the need for effective reportable disease surveillance.

An 18% reporting rate in 2001 among Naval hospitals is disappointing, especially with the availability of electronic reporting and the existing preventive medicine knowledge at all levels of disease surveillance. This study demonstrates the need for an evaluation of the entire reporting process to identify targeted areas for improvement. For more information contact Asha Riegodedios at riegodediosa@nehc.med.navy.mil or CDR Mark Malakooti at malakootim@nehc.med.navy.mil.

NAVY DISEASE REPORTING SYSTEM (NDRS)**SUMMARY OF 2002 DATA**

Tables 1 and 2 display the confirmed Medical Event Reports (MERs) received at Navy Environmental Health Center (NEHC) from 01 Jan to 31 Mar 2002. Interested readers may calculate rates by dividing

the frequencies by estimated mid-quarter strength of 381,237 for USN and 172,935 for USMC. Table 1 shows active duty only. Table 2 shows non active duty beneficiaries.

Table 1. ACTIVE DUTY Reportable Medical Events, Navy & Marine Corps, Case Frequencies, 01 Jan – 31 Mar, 2002								
Disease	Total	USN	USMC	Disease	Total	USN	USMC	
Amebiasis*	0	0	0	Lyme Disease	1	0	1	
Anthrax*	0	0	0	Malaria (specify type) *	0	0	0	
Biological warfare agent exposure	0	0	0	Measles*	0	0	0	
Bites, rabies vaccine & human rabies IG	13	4	9	Meningitis (aseptic, viral)	1	1	0	
Bites, venomous animal	0	0	0	Meningitis (bacterial other than Meningococcus)	0	0	0	
Botulism*	0	0	0	Meningococcal disease*	1	1	0	
Brucellosis	0	0	0	Mumps	0	0	0	
Campylobacteriosis*	2	2	0	Occupational exposure to blood borne pathogens	1	1	0	
Carbon Monoxide poisoning*	0	0	0	Onchocerciasis	0	0	0	
Chemical warfare agent exposure	0	0	0	Pertussis*	0	0	0	
Chlamydia	575	447	128	Plague*	0	0	0	
Cholera	0	0	0	Pneumococcal pneumonia	0	0	0	
Coccidioidomycosis	4	4	0	Poliomyelitis*	0	0	0	
Cold injuries	1	1	0	Psittacosis (Ornithosis)	0	0	0	
Cryptosporidiosis*	0	0	0	Q Fever*	0	0	0	
Cyclospora*	0	0	0	Rabies, clinical human*	0	0	0	
Dengue fever*	0	0	0	Relapsing fever	0	0	0	
Diphtheria	0	0	0	Rift Valley fever	0	0	0	
E. Coli 0157:H7 infection*	0	0	0	Rocky-Mountain Spotted Fever	0	0	0	
Ebola	0	0	0	Rubella*	0	0		
Ehrlichiosis	0	0	0	Salmonellosis*	1	1	0	
Encephalitis*	0	0	0	Schistosomiasis	0	0	0	
Filariasis	0	0	0	Shigellosis*	0	0	0	
Giardiasis	0	0	0	Smallpox*	0	0	0	
Gonorrhea	149	104	45	Streptococcal disease, Group A	3	3	0	
Haemophilus influenza, type b	0	0	0	Syphilis	6	6	0	
Hantavirus infection*	0	0	0	Tetanus	0	0	0	
Heat injuries	0	0	0	Toxic shock syndrome	0	0	0	
Hemorrhagic fever*	0	0	0	Trichinosis	0	0	0	
Hepatitis, A (acute, symptomatic only)	0	0	0	Trypanosomiasis	0	0	0	
Hepatitis, B (acute, symptomatic only)	3	2	1	Tuberculosis, pulmonary active*	1	1	0	
Hepatitis, C (acute, symptomatic only)	0	0	0	Tularemia*	0	0	0	
Influenza (confirmed)	3	3	0	Typhoid fever*	0	0	0	
Lead poisoning	0	0	0	Typhus*	4	0	4	
Legionellosis*	0	0	0	Urethritis (non gonococcal)	29	12	17	
Leishmaniasis	0	0	0	Varicella	2	2	0	
Leprosy (Hansen's disease)	0	0	0	West Nile	0	0	0	
Leptospirosis*	0	0	0	Yellow fever	0	0	0	
Listeriosis	0	0	0					

*Reportable within 24 hours

Table 2. BENEFICIARIES Reportable Medical Events, Navy & Marine Corps, Case Frequencies, 1 Jan - 31 Mar, 2002

Disease	Total	USN	USMC	Disease	Total	USN	USMC
Amebiasis*	0	0	0	Lyme Disease	0	0	0
Anthrax*	0	0	0	Malaria	0	0	0
Biological warfare agent exposure	0	0	0	Measles*	0	0	0
Bites, rabies vaccine & human rabies IG	38	28	10	Meningitis (aseptic, viral)	0	0	0
Bites, venomous animal	0	0	0	Meningitis (bacterial other than Meningococcus)	1	1	0
Botulism*	0	0	0	Meningococcal disease*	0	0	0
Brucellosis	0	0	0	Mumps	0	0	0
Campylobacteriosis*	5	4	1	Occupational exposure to blood borne pathogens	1	0	1
Carbon Monoxide poisoning*	5	5	0	Onchocerciasis	0	0	0
Chemical warfare agent exposure	0	0	0	Pertussis*	2	2	0
Chlamydia	142	125	17	Plague*	0	0	0
Cholera	0	0	0	Pneumococcal pneumonia	1	1	0
Coccidioidomycosis	3	3	0	Poliomyelitis	0	0	0
Cold injuries	0	0	0	Psittacosis (Ornithosis)	0	0	0
Cryptosporidiosis*	1	1	0	Q Fever*	0	0	0
Cyclospora*	0	0	0	Rabies, clinical human*	0	0	0
Dengue fever*	0	0	0	Relapsing fever	0	0	0
Diphtheria	0	0	0	Rift Valley fever	0	0	0
E. Coli 0157:H7 infection*	0	0	0	Rocky-Mountain Spotted Fever	0	0	0
Ehrlichiosis	0	0	0	Rubella*	0	0	0
Encephalitis*	0	0	0	Salmonellosis*	4	4	0
Filariasis	0	0	0	Schistosomiasis	0	0	0
Giardiasis	1	1	0	Shigellosis*	6	6	0
Gonorrhea	25	22	3	Smallpox*	0	0	0
Haemophilus influenza, type b	0	0	0	Streptococcal disease, Group A	9	8	1
Hantavirus infection*	0	0	0	Syphilis	2	1	1
Heat injuries	0	0	0	Tetanus	0	0	0
Hemorrhagic fever*	0	0	0	Toxic shock syndrome	0	0	0
Hepatitis, A (acute, symptomatic only)	0	0	0	Trichinosis	0	0	0
Hepatitis, B (acute, symptomatic only)	2	1	1	Trypanosomiasis	0	0	0
Hepatitis, C (acute, symptomatic only)	2	2	0	Tuberculosis, pulmonary active*	3	3	0
Influenza (confirmed)	30	30	0	Tularemia*	0	0	0
Lead poisoning	1	1	0	Typhoid fever*	0	0	0
Legionellosis*	0	0	0	Typhus*	0	0	0
Leishmaniasis	0	0	0	Urethritis (non gonococcal)	1	0	1
Leprosy (Hansen's disease)	0	0	0	Varicella	0	0	0
Leptospirosis*	0	0	0	Yellow fever*	0	0	0
Listeriosis	0	0	0				

2001 Top Ten List – Medical Event Reports

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An integral component of preventive medicine is disease surveillance. The Naval Disease Reporting System (NDRS) provides a cornerstone for information flow within the Navy and Marine Corps, and an ongoing source of medical surveillance. The reportable events in NDRS were reviewed and are presented graphically. Figure 1 represents the 10 most frequent reportable medical events submitted to NDRS for calendar year 2001. Although these figures represent cases from 2001, it is worth noting that these events appeared frequently in previous years. All cases are for active duty service members only. Figures 2 and 3 represent reportable events for Navy and Marine Corp installations.

Sexually transmitted diseases remain the leading diagnoses, and provide the largest proportion (91%) of reports. The significant STD problem within the Navy and Marine Corps presents the opportunity for the preventive medicine community to review the current interventions in place for STD prevention (awareness, education and clinical interventions), and evaluate their effectiveness. Policy development and re-evaluation of

resource allocations may be warranted.

Many providers are unaware of certain reportable medical events, e.g. heat related injuries in particular. Consequently, facilities are likely to be underreporting medical events, which is an area of concern. In order to gather adequate information on disease distribution, trends, and associated risk, timely and accurate NDRS reporting is needed. We rely on efforts from the medical departments treating Sailors and Marines to submit medical event reports. Refer to BUMEDINST 6220.12A for a list of reportable medical events and their submission requirements (available in pdf format and downloadable from <http://navymedicine.med.navy.mil/instructions/external/6220-12A.pdf>).

The data gathered through NDRS from these reports are analyzed and generated into information for dissemination, decision-making, and policy/intervention planning. Disease surveillance is a particularly important issue because medical events can have considerable impact on the health and readiness of Navy and Marine Corps personnel. The goal is to have Sailors and Marines that are disease free and fit for duty.

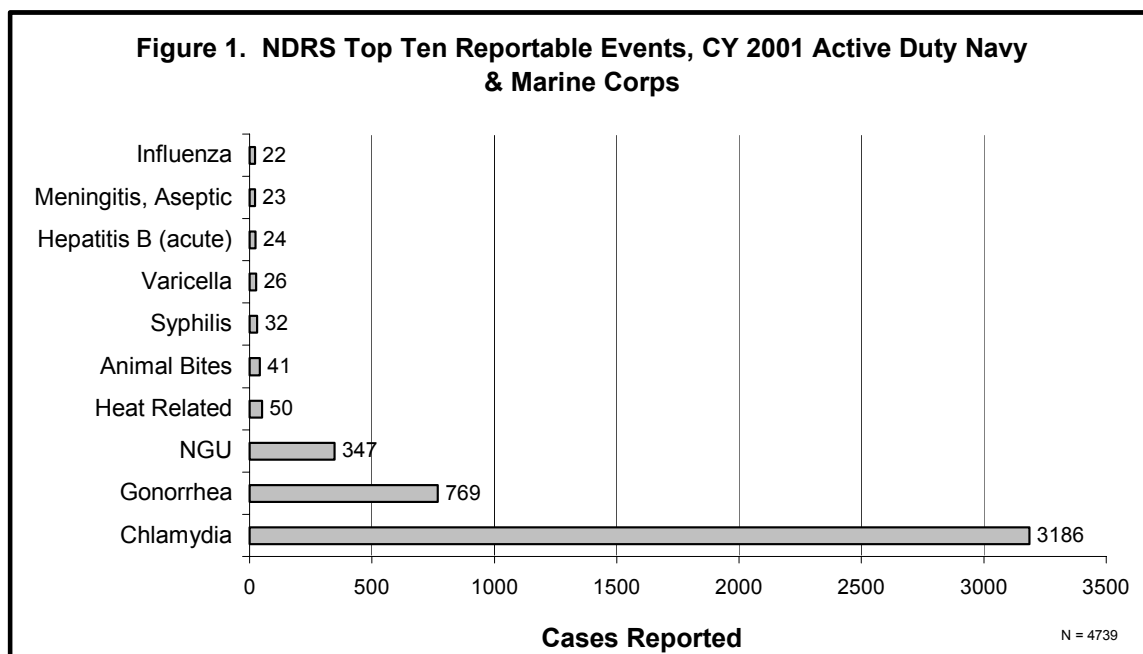


Figure 2. Active Duty Navy Top Ten Reportable Events, CY 2001

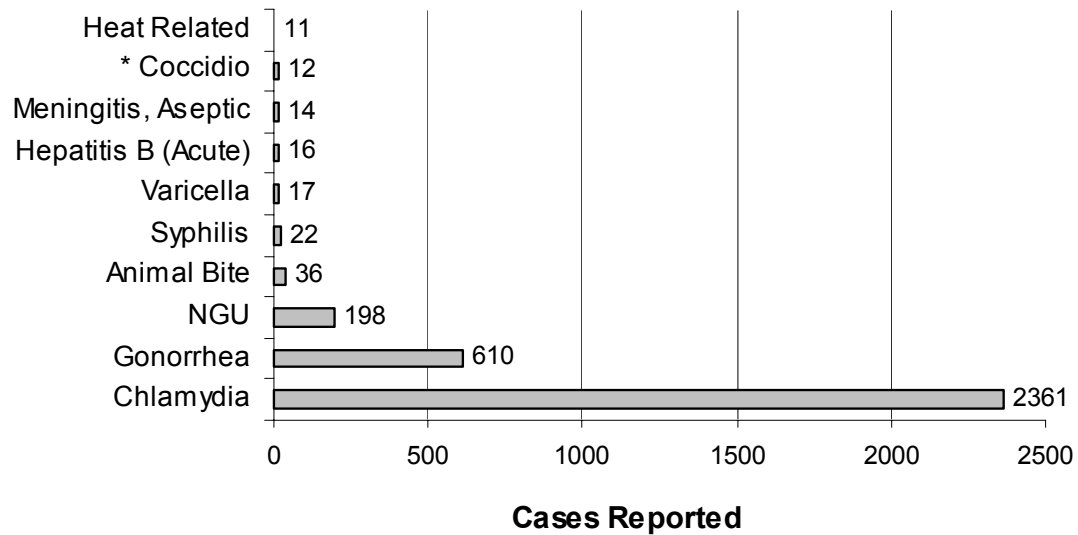
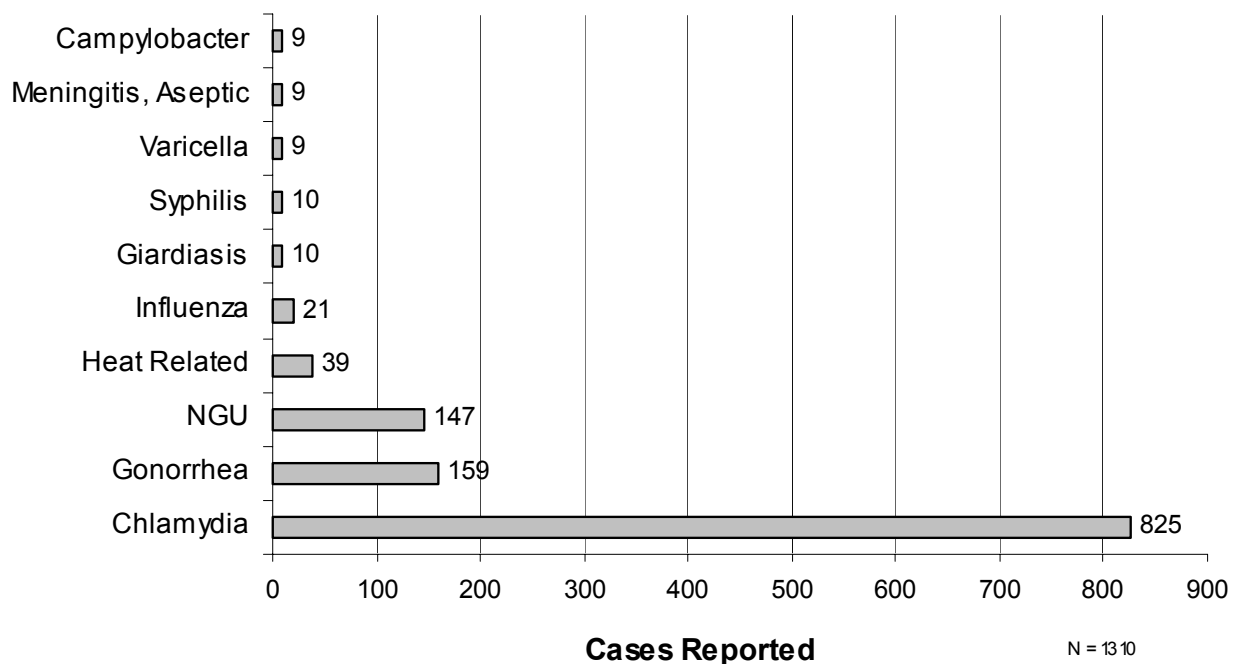


Figure 3. Active Duty Marine Corps Top Ten Reportable Events, CY 2001



Summary Of Navy And Marine Corps Deaths, 1980-1999

Asha Jindal Riegodedios, MSPH

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Introduction

Health is critical to the readiness of our forces and is important now more than ever as we are in a time of war. Epidemiology provides valuable insights into the determinants of adverse health outcomes, the effectiveness of health interventions, and the integrity of policies designed to protect the health of our forces. Unfortunately, very little information and data are available to provide a sound epidemiological overview of the health of our Navy and Marine Corps forces. In particular, mortality data are a very important indicator of the overall health of a population. Deaths may reduce and even cripple the ability of our forces to carry out missions; although hostile deaths produce immediate consequences for our forces, nonhostile deaths are also of interest as they outnumber hostile deaths, and the majority of nonhostile deaths are preventable through public health initiatives. Monitoring mortality data in order to reduce deaths in our military population, therefore, is vital to ensuring the readiness of our forces. This report summarizes aggregate death data for active duty United States Navy and Marine Corps.

Methods

The Navy and Marine Corps casualty offices collect information on casualties occurring within their respective military populations. Their mission is to provide timely support and assistance to family members of personnel who die while on active duty or training. Casualty data are then provided to the Washington Headquarters Services Directorate of Information Operation and Reports (WHS/DIOR). Information is compiled from the "Active Duty Military Deaths" DD Form 1300. The following summary was compiled using data obtained from the WHS/DIOR Statistical Information and Analysis Division¹. Aggregate data including numbers of deaths, force strength, and death rates are reported by military service, gender,

and five broad cause-of-death categories (including accidents, illnesses, homicides, suicides, and hostile deaths) for 1980 to 1999. Nonhostile deaths include deaths due to accidents, illnesses, homicides, and suicides.

Results

United States Military

Figure 1 shows the overall death rates for each military service from 1980 to 1999. Death rates for all military services have decreased over the past two decades. Dramatic peaks in death rates shown by the Marine Corps and Army indicate the results of hostile events on those services². Air Force death rates have consistently remained below that of the death rates for other services. Death rates in the Navy have been similar to that of all services, while rates in the Marine Corps and Army have generally been above that of the total death rates of all services.

Nonhostile death rate trends by cause of death for all active duty military members from 1980 to 1999 are shown in Figure 2. Deaths rates from all four cause-of-death categories declined from 1980 to 1999. Throughout the past two decades, death rates from accidents were two to three times that of illnesses, homicides, or suicides. The number of accidental deaths has decreased by 74% from 1980 to 1999 (1,577 accidental deaths in 1980, 411 accidental deaths in 1999). However, in 1999, deaths due to accidents still accounted for 54% of all deaths among active duty military (Figure 3).

Nonhostile death rates by gender are shown in Figure 4. Death rates among males decreased 52% while females decreased 40% over the two decades. In general, death rates for accidents, illnesses, and homicides decreased for both genders, though not as dramatically for females as compared to males.

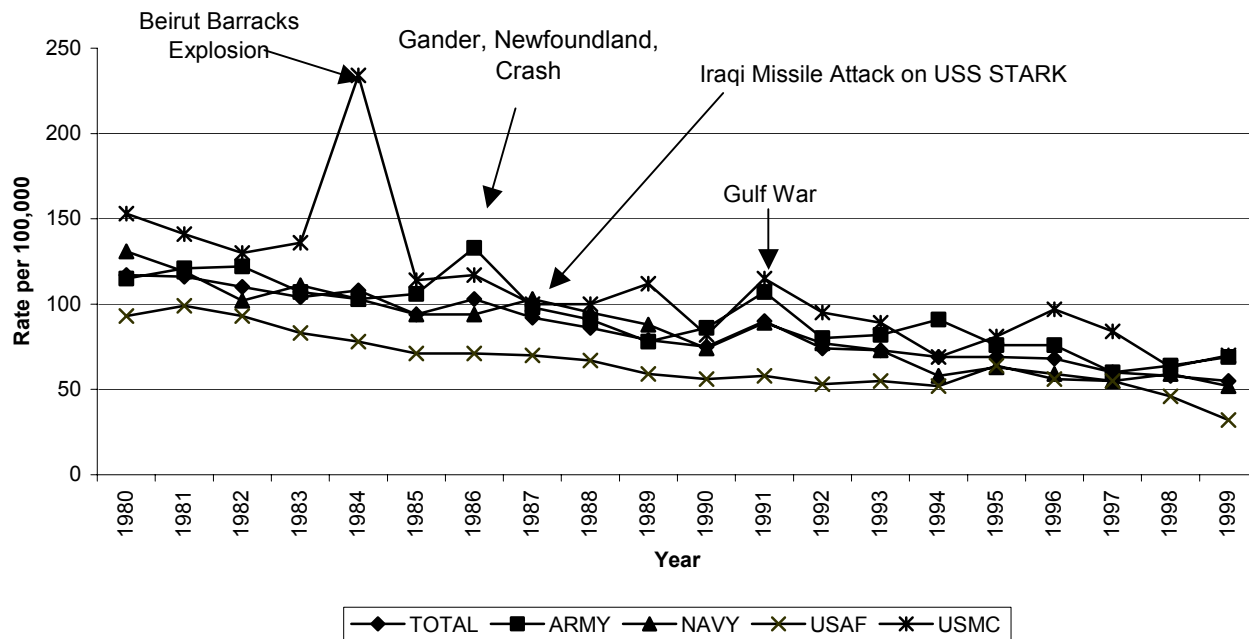
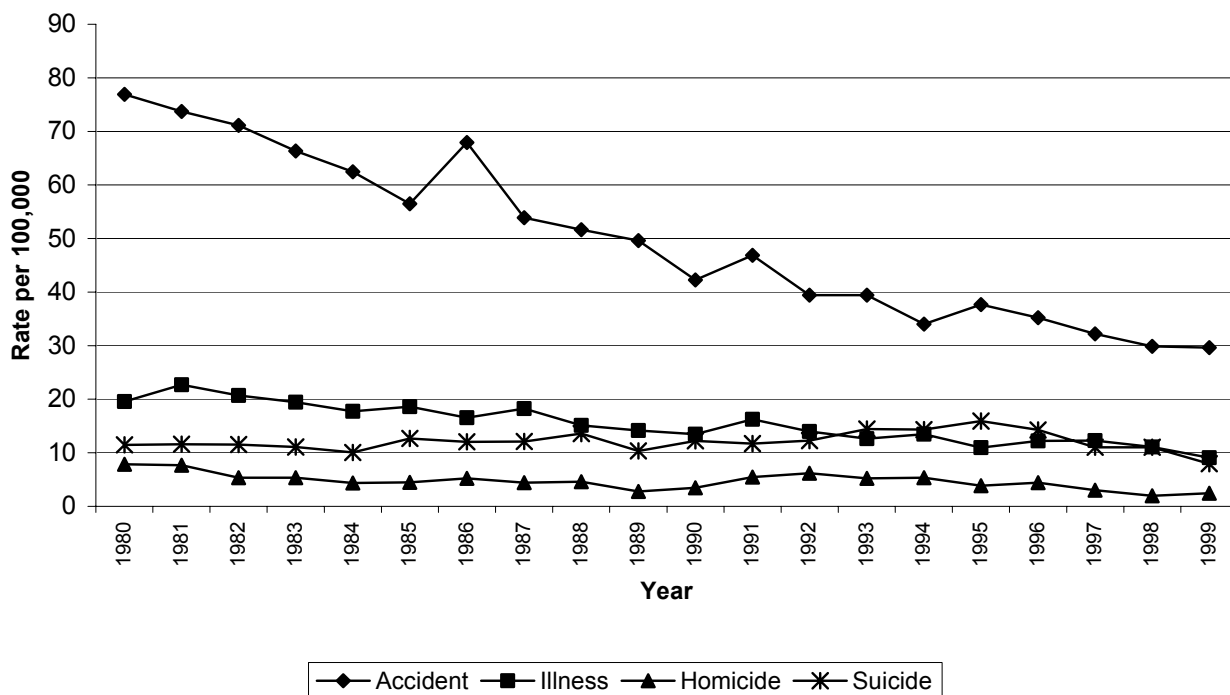
Figure 1. Military All-Cause Death Rates by Service, FY 1980-1999**Figure 2. Active Duty Military Nonhostile Death Rates by Cause of Death, FY 1980-1999**

Figure 3. Percentage of Active Duty Military Deaths by Cause-of-Death, FY 1999

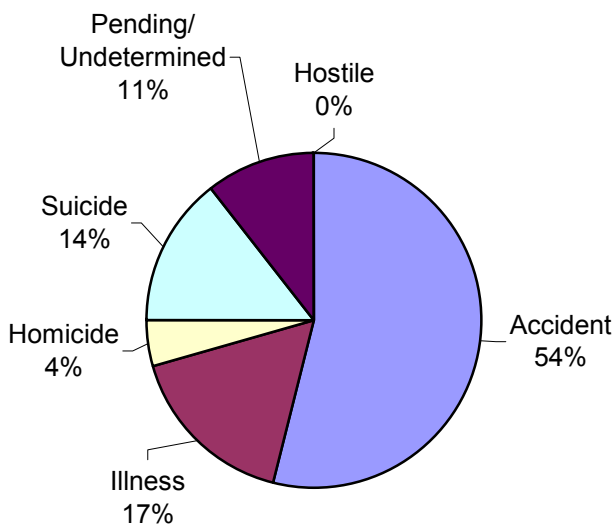
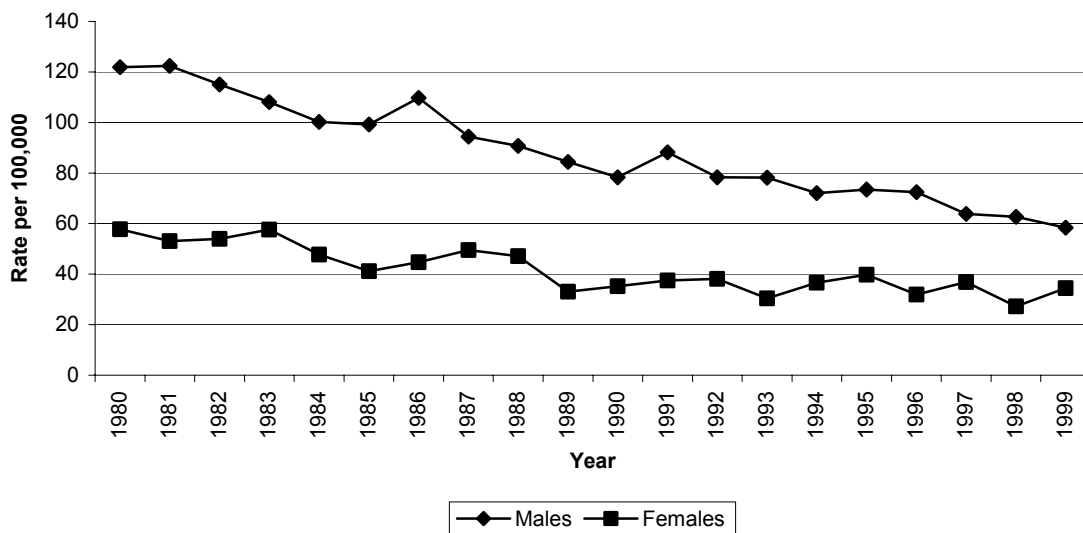


Figure 4. Military Active Duty Nonhostile Death Rates by Gender, FY 1980-1999



United States Navy

Overall death rates among active duty Navy personnel declined from 1980 to 1999. The most dramatic decline is seen among deaths caused by accidents (Figure 5). The number of accidental deaths decreased by 78%, the number of deaths from illnesses decreased by 67%, the number of homicides decreased

by 79%, and the number of suicides decreased by 43%. It is worth noting that the number of homicides decreased from 43 in 1980 to 9 in 1999. In 1999, accidents accounted for 53% of all deaths in the Navy, while illness and suicide each accounted for 18% of all deaths (Figure 6).

Figure 5. Navy Active Duty Nonhostile Death Rates by Cause of Death, FY 1980-1999

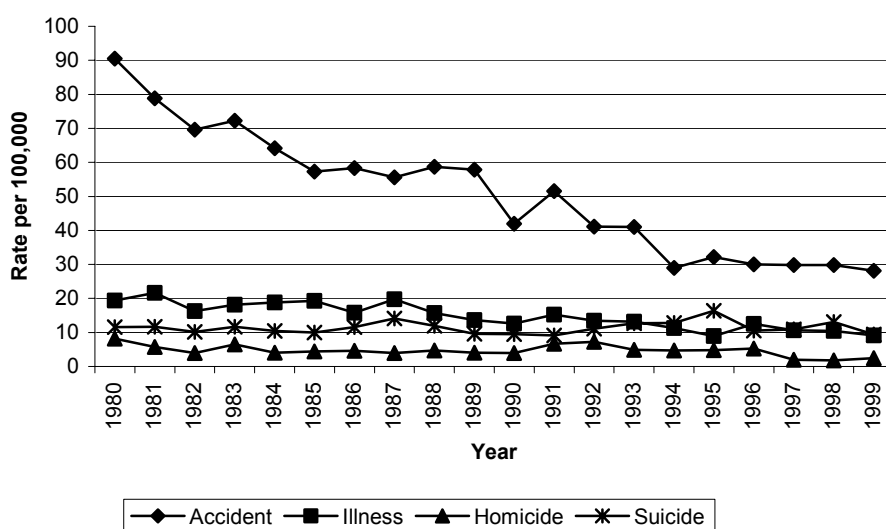
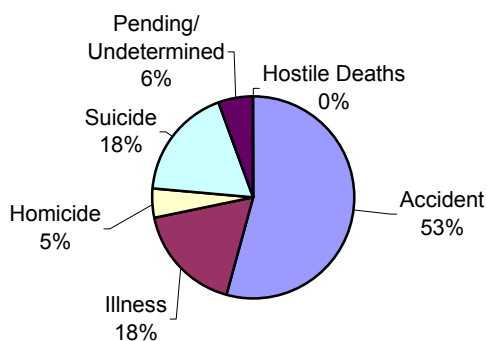


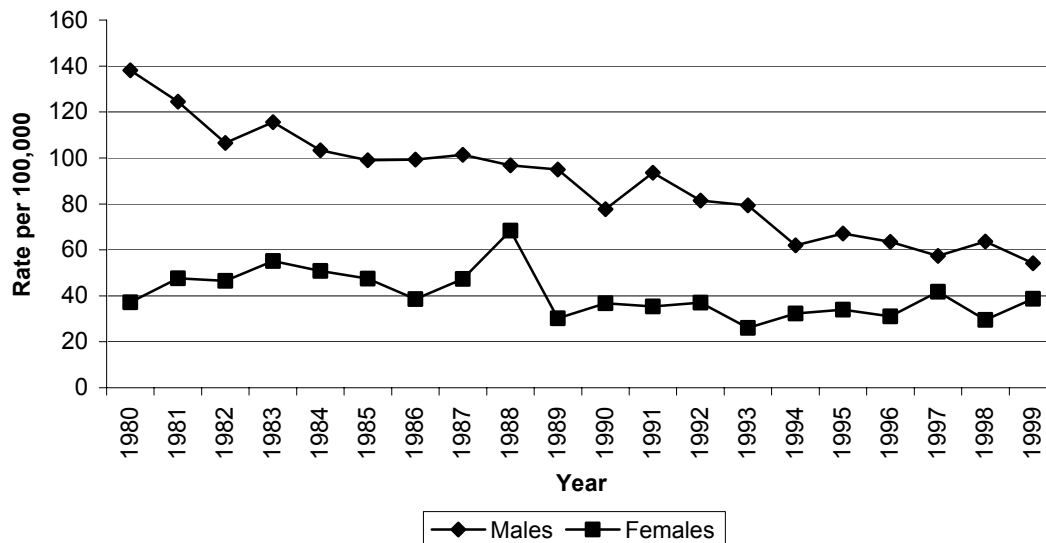
Figure 6. Percentage of Navy Active Duty Deaths by Cause of Death, FY 1999



A comparison of nonhostile death rates between Navy males and females is presented in Figure 7. The death rate among males decreased 61% from 1980 to 1999, mostly due to an 80% decrease in the number of deaths

caused by accidents. Death rates among females generally remained the same. A small increase in the number of accidental deaths in 1988 caused a dramatic increase in the death rates during this time.

Figure 7. Navy Active Duty Nonhostile Death Rates by Gender, FY 1980-1999



United States Marine Corps

Overall death trends for the United States Marine Corps are similar to that of the Navy with decreasing death rates over time across all causes of nonhostile death rates (Figure 8). However overall death rates in the Marine Corps have generally been higher than the Navy. In 1999, the death rate in the Marine Corps was 1.35 times that of the Navy ($X^2=6.69$, $p\text{-value}=0.010$). In that same year, the accidental death rate among Marine Corps members was 1.5 times that of the

Navy ($X^2=6.69$, $p\text{-value}=0.010$) while the homicidal death rate in the Marine Corps was 1.7 times that of the Navy ($X^2=1.09$, $p\text{-value}=0.298$) (Figure 9). Of interest, from 1980 to 1999, the number of deaths by suicide among the Marine Corps decreased by 75% as compared to 43% among the Navy. In fact, in 1999, the rate of suicide (as with illness) in the Navy was double that of the Marine Corps (suicide: $X^2=4.35$, $p\text{-value}=0.037$; illness: $X^2=5.12$, $p\text{-value}=0.237$).

Figure 8. Marine Corps Active Duty Nonhostile Death Rates by Cause of Death, FY 1980-1999

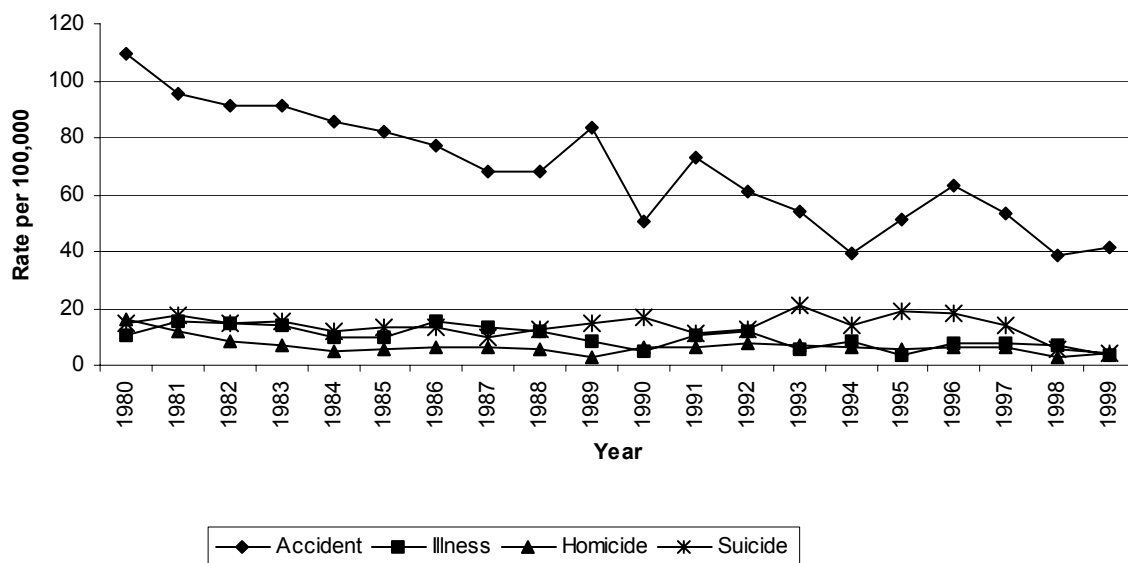


Figure 9. Active Duty Death Rates by Cause and Service, FY 1999

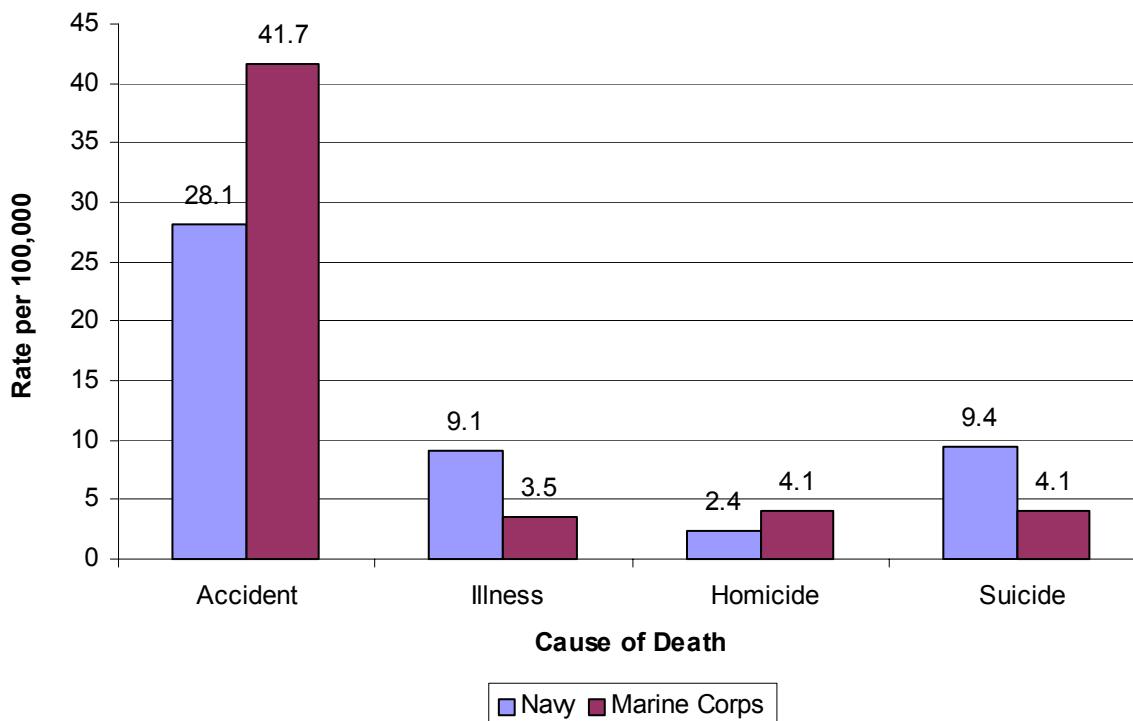
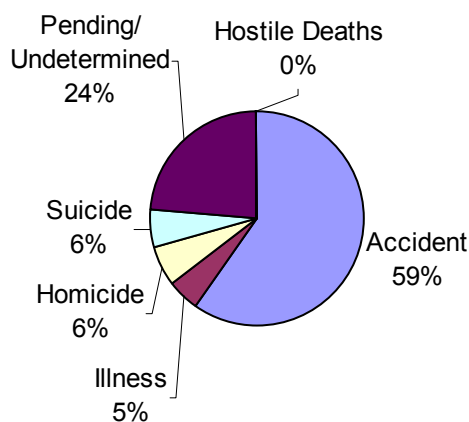


Figure 10 shows the distribution of deaths by cause for Marine Corps in 1999. The Marine Corps has a smaller percentage of deaths due to illness and suicide and a greater number of “pending or

undetermined” deaths as compared to the Navy. A comparison of deaths between males and females of the Marine Corps was not performed because of the small number of deaths among the female population.

Figure 10. Percentage of Marine Corps Active Duty Deaths by Cause, FY 1999



Conclusions and Discussion

Death rates among active duty service members in the military and in the Navy and Marine Corps have decreased over time, mainly due to the decrease in accidental deaths. Prevention efforts in this area should be applauded across all services. Deaths due to illness, homicide, and suicide have also decreased over time with Marine Corps especially successful in reducing the number of homicides. These trends are in agreement with previous studies that have examined death data among active duty military³⁻⁵. Interestingly, active duty females have experienced a slower decline in deaths as compared to active duty males, although deaths among active duty females have consistently remained

lower. Caution should be taken in drawing conclusions from this data because of the small number of female servicemembers and female deaths involved. Gender differences should be explored when analyzing morbidity data.

Although general trends over time are similar for Navy and Marine Corps, death rates and number of deaths appear to be different between the services. Efforts to prevent suicide and illness should be focused on the Navy while efforts to prevent accidents should be focused on the Marine Corps.

The data used in this report provide a limited picture of deaths occurring among our active duty population. A significant limitation is that it is unknown exactly what the broad death categories

It is clear from this and other summaries, that efforts to reduce deaths among our active duty population have been successful. It is also apparent that these efforts should continue especially to reduce accidents and suicides. More in-depth analysis in these areas might determine whether current prevention

Thanks to Roger Jorstad with the Directorate for Information Operations and Reports, Washington Headquarters Services for assistance with the data and to CAPT Bruce Bohnker, CDR Mark Malakooti, and Tamara Telfair with NEHC for manuscript review.

1. Internet address: <http://web1.whs.osd.mil/mmid/mmidhome.htm>
2. Atlas of Injuries in the U.S. Armed Forces. [Mil Med](#) 164.8 (Suppl), August 1999.
3. Powell KE, Fingerhut LA, Branche CM, Perotta DM [2000], "Deaths Due to Injury in the Military," [Am J Prev Med](#), 18 (3 Suppl): 26-32.
4. Army Medical Surveillance Activity [1999], "Mortality Trends Among Active Duty Military Servicemembers, 1990-1997," [MSMR](#) 5.1: 8-10.
5. Helkamp JC, Kennedy RD [1996], "Causes of Death Among U.S. Military Personnel: a 14-year Summary, 1980-1993," [Mil Med](#) 161.6:311-7.

Anthrax Vaccine Adverse Event Reporting System (VAERS) Update

Table 1 displays the total Anthrax VAERS reports submitted through 29 March 2002. The source of this data is the Army Medical Surveillance Activity

(AMSA). No new reports were submitted for this quarter.

Table 1. Cumulative Data (date 28 Aug 1998 – 29 Mar 2002)							
	VAERS Report		Classification				
Service	Required		Local Reaction			Systemic Reaction	Cum. Totals
	Yes	No	Mild	Moderate	Severe		
USA	13	106	14	23	13	69	119
USN	4	69	6	7	8	52	73
USAF	30	419	31	49	30	339	449
USMC	2	26	1	6	2	19	28
USCG	0	1	0	1	0	0	1

Excludes 4 ODS/DS VAERS Reports on Anthrax and Non-DoD Reports

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